REMARKS

Claims 1-7 are currently pending in the application. In view of the above amendments and the followings remarks, Applicant requests the reconsideration and allowance of claims 1-7.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillner et al. (DE 1005916 A1) in view of Murar et al. (U.S. Patent No. 6,579,402) and Kobayashi et al. (U.S. 2002/0108707). The Examiner takes the position that the combination of Murar and Kobayashi teach or suggest all the features recited in claims 1-7. Applicants respectfully disagree.

Gillner is directed to a method for producing a lasting connection between a planar lightweight plastic component that has a quality surface and an element. The element consists of a laser-light transparent material being fastened to a surface facing away from the quality surface and contacts on the surface. The areas of the contact are irradiated with laser light that is passed through the element in such a manner that the laser light energy is partially absorbed by the lightweight plastic component, thereby materially connecting the lightweight plastic component in the contact areas in the manner of a weld joint.

Kobayashi is directed to a bonding method in which a first member is bonded to a second member using at thermosetting resin adhesive. Kobayashi also discloses a heater that is pressed onto the first member and heats first member. Selective cooling is utilized to assure an acceptable temperature gradient.

Murar discloses that method and system for an airbag cover assembly utilizing infrared radiation. Murar further discloses that the bonding surface can be heated very quickly with infrared energy and the timing and amount of heat application can be precisely controlled.

The present invention provides that the transparent plastic structural component part

is heated beforehand in order to reduce the temperature difference between the plastic structural component parts when joining, so that a faster melting of the transparent plastic structural component part is carried out by heat conduction during joining, and a thermal expansion in the absorbing plastic structural component part in the direction of the quality surface is limited. Furthermore, in the present invention, the temperature difference between the nonabsorbent structural component part and the absorbent structural component part is slight. In other words, the temperature difference between the structural component parts is small, which results in a reduced flow of heat in the direction of the nonabsorbent structural component part to be heated. Accordingly, the previous heating reduces the efficiency of the heating during the actual welding process.

Gillner does not teach or suggest a transparent structural component part being pre-heated. Rather, Gillner discloses the use of transmitted laser welding. Also in combination with Murar and Kobayashi, there is no teaching for a person skilled in the art with respect to the problem of the occurrence of visible deformation on the class A side in thin structural component parts when using transmitted laser welding. In other words, when applying the method of Gillner in thin-walled plastic structural component parts, the quality of the surface on the class A side is impaired due to incursion of the material.

This deformation substantially results not from different expansion coefficients of the materials to be joined, but rather due to the fact that the energy to be introduced into the class A structural component part is too high and consequently, through the conduction of heat in the class A structural component part, an overly large softening area or heat influx area occurs. Thus, it is not obvious to fixedly join a hot structural component part to a thin-walled cold structural component part, since a different thermal expansion results from the temperature difference, which would lead one to expect stresses and impairment of the quality of the structural component part after the cooling, which is particularly true for the

described stiffening structural component parts.

In Kobayashi it is disclosed that the nonabsorbent structural component part is already hot. Consequently, less heat flows out of the absorbent structural components part into the nonabsorbent structural component part, and in opposite directions. Murar merely states that overheating can damage the class A surface during welding.

In the present invention, there is a large temperature difference between the two parts to be joined prior to joining. With the exception of the very limited joining zone, this temperature difference is retained during the welding process. Since joining and fixedly connecting the two structural component parts having a large temperature difference between them produce an unwanted deformation in the class A structural component part due to varying thermal expansion, a person skilled in the art would not heat the transparent part to be joined. Therefore, it is submitted that one skilled in the art would not combine the teachings of Gillner with that of Kobayashi and Murar to heat the transparent part to be joined in order to prevent thermal stresses from varying expansion coefficients.

Furthermore, the teachings of the cited references in combination would not have the same operable features or the benefits provided by the claimed invention. For instance, even though faster heating of the transparent structural component part is an additional positive affect, the effect disclosed by Kobayashi has entirely different results with respect to the efficiency of heating.

Specifically, Kobayashi addresses a completely different problem than that of the present invention. Kobayashi discloses a method to connect parts to be joined using heat sources in such a way that there is no impairment of the bond due to stresses occasioned by varying expansion during the joining process and during cooling. The varying expansions are caused by varying temperatures differences and expansion coefficients. As a result, Kobayashi discloses minimizing the temperature gradients in the parts to be joined

themselves as well as between them. Further, the efficiency of the heating of one of the parts to be joined is to be increased.

The present invention provides a method that overcomes the conflict between a structural component part (class A structural component part) being heated in order to introduce energy into the other structural component part through heat conduction and the constant supply of energy needed for this causing an unwanted softening of the absorbent class A structural component part at excessive material depths due to heat conduction. This means that a higher temperature gradient must be achieved in the absorbent structural component part in that the surface of contact with the nonabsorbent structural component part should be hot and the area of the absorbent structural component part directly adjoining the contact surface should be as cold as possible.

Therefore, according to the invention, steps are taken to reduce the energy required for reaching the softening temperature at the nonabsorbent structural component part. These steps consist in heating the transparent structural component part so that the acting period of the laser and the energy to be introduced are reduced to a minimum.

As a result, a hot structural component part and a cold structural component part are joined, and there is a very high temperature difference between the structural component parts at the start of the joining process which is also retained, with the exception of the zone of the absorbent structural component part into which heat flows. This is the essential difference with respect to Kobayashi.

In Kobayashi, the efficiency is increased in that the nonabsorbent structural component part is already hot. Consequently, less heat flows out of the absorbent structural component part into the nonabsorbent structural component part. This is particularly significant for the described method because the nonabsorbent structural component part would act as a strong heat sink because of its thermodynamic properties if it were not already

heated. Thus, the IR heating is very inefficient. Therefore, one skilled in the art would not combine the teachings of Kobayashi and Murar with Gillner.

Applicants respectfully disagree with final conclusion reached by the Examiner, that the pre-heating of the transparent structural component part is obvious for reducing the required introduction of energy into the class A structural component part and, consequently, to fall below the threshold of damage to the class A surface and to reduce the thermal expansion of the class A structural component part by reducing the heating of the latter in view of the preceding arguments.

Thus, it is respectfully submitted that the cited references fails to teach or suggest a method for joining plastic structural component parts by means of laser radiation including the step of heating the transparent plastic structural component part beforehand in order to reduce the temperature difference between the plastic structural component parts when joining, so that a faster melting of the transparent plastic structural component part is carried out by heat conduction during joining, and a thermal expansion in the absorbing plastic structural component part in the direction of the quality surface is limited. Since neither Kobayahsi nor Murar cure the deficiencies of Gillner, it is respectfully submitted that claim 1 recites patentable subject matter. Therefore, Applicants request the withdrawal of the rejection of claim 1 under 35 U.S.C. 103(a).

Claims 2-7 are dependent upon claim 1. Therefore, it is submitted that for at least the reasons mentioned above claims 2-7 recite subject matter that is neither taught nor suggested by the applied references. Accordingly, Applicants request the withdrawal of the rejection of claim 2-7 under 35 U.S.C. 103(a).

Based upon the above amendments and remarks, Applicants respectfully request reconsideration of this application and its earlier allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,

Reed Smith LLP
599 Lexington Avenue
29th Floor
New York, NY 10022-7650

Gerald H. Kiel
Reg. No. 25,116
Telephone: 212-521-5400
Facsimile: 212-521-5450